every facility afforded. If this be not the duty of the State it is difficult to explain its *raison d'être.*

The question from the economical point of view is—Shall we pay heavy rates for prisons and workhouses, or shall we try to lighten them by the spread of education? It is well to remember that the law of supply and demand will not avail here, for they who most want it are the least likely to ask for instruction. Perhaps, Mr. Wallace's chief objection is to the unsatisfactory way the money raised by rating, is expended. And here is room for large reforms, if not retrenchment. His proposal regarding the British Museum seems admirable. It is painful to see what excellent opportunities for teaching those who really require it, are lost in that magnificent collection, for want of a little, a *very little*, more expense and trouble.

These remarks are made from the very lowest stand-point, the principle of self-interest—a principle, I believe, your correspondant would heartily despise; for the man of science is essentially liberal, essentially averse to huckstering calculations of profit and loss, essentially unqualified for scrambling after loaves and fishes.
E. G. A.

Kant's View of Space

I AM quite willing to leave the readers of NATURE and the students of Kant to decide on the propriety, in English philosophical discourse, of calling Space and Time "forms of Thought," the more so as Sir W. Hamilton—a great stickler for philosophic precision—uses the term in that sense and would have been surprised to hear that he had misrepresented Kant in so doing. My opponents persist in limiting the term Thought to the restricted meaning given to it in Kant's terminology, which, in English, is restricting it to Conception or Judgment: on this ground they might deny that Imagination or Recollection could be properly spoken of as Thought. Throughout I have accepted Thought as equivalent to mental activity in general and the "forms of Thought" as the conditions of such activity. The "forms of Thought" are the forms which the thinking principle (Kant's *pure* Reason) brings with it, antecedent to all experience. The thinking principle acts through three distinct faculties: Sensibility (Intuition), Understanding (Conception), and Reason (Ratiocination): to suppose Thought absent from Intuition, is to reduce Intuition to mere sensuous impression. Therefore, whatever is a form of Intuition must be a form of Thought.

The following passage from Mr. Mahaffy's valuable translation of Kuno Fischer's work on Kant, may here be useful: "Sensibility and understanding are cognitive faculties differing not in degree but in kind, and form the *two original faculties of the human mind*" . . . . The general problem of a Critick of the Reason "is subdivided into two particular objects, as human Reason is into two particular faculties of knowledge. The first object is the investigation of the sensibility; the second, that of the understanding. The first question is, How is rational knowledge possible through sensibility? The second question, How is the same knowledge possible through the understanding?" (pp. 4, 5.)

Those who maintain that it is improper to speak of Space and Time as forms of Thought, must either maintain that Kant held Sensibility *not* to be a faculty of the Mind (thinking principle); or that the term Thought is *not*, in English discourse, a correct expression for the activity of the thinking principle. I believe that the student will agree with me in saying that, although Kant restricted the term Thought to what we call Conception or Judgment, he understood by the activity of the mental faculties (Pure Reason) what we understand by Thought.

It is not, however, to continue this discussion that I again trespass on your space; but to reply to the personal part of Mr. Sylvester's letter. He charges me with misquoting myself and with misquoting him. I said that, in my exposition, Space and Time were uniformly spoken of as forms of Intuition and I say so still. Mr. Sylvester has taken the trouble of reading that exposition without taking the trouble of understanding it; he declares that he "has marked the word intuition as occurring once and forms of sensibility several times; but forms of intuition never." His *carefulness* may be estimated by the fact that the word intuition occurs *four* times on the two pages: his *comprehension* by the fact that it is perfectly indifferent whether Sensibility or Intuition be the term employed, since sensibility is the faculty and Intuition the action of that faculty. Mr. Sylvester, not understanding this, says "If form of sensibility is as good to use as form of intuition, form of understanding ought to be as good as form of thought; but Mr. Lewes owns that the former is indefensible, whilst he avers that the latter is correct." Considering that this passage occurs in a letter which charges me with unfair misquotation, it is curious. So far from owning that the former is "indefensible," it is what I declare to be true; and, with regard to the latter, though I do think a form of Understanding is a form of Thought, my statement was altogether *away* from it, namely, that Space and Time as forms of Sensibility, would be incorrectly spoken of as forms of the Understanding.

With regard to the alleged misquotation of his own words, which he characterises as unfair and as "too much like fighting with poisoned weapons," it was a charge which both astonished and pained me. There are few things for which I have a bitterer contempt than taking such unfair advantages of an adversary. I beg to apologise to Professor Sylvester for any misrepresentation which, unintentionally, I may have been guilty of. But, in accepting his denial of the construction I placed upon his language, I must still say that, after re-reading his letter, I am at a loss to see what other construction it admits of, that has any bearing on the dispute, and that he has not expressed his meaning with sufficient clearness. Intuition and Thought are there compared with Force and Energy as terms "not convertible"; Force is detached from Energy as potential from actual and Intuition without Thought, is made to hold an analogous position. Here is the passage; let the reader judge:—

"Can Mr. Lewes point to any passage in Kant where Space and Time are designated *forms of Thought?* I shall indeed be surprised if he can do so—as much surprised as if Mr. Todhunter or Mr. Routh in their Mechanical Treatises were to treat *energy* and *force* as convertible terms. To such a misuse of the word energy it would be little to the point to urge that *force without energy is a mere potential tendency.* It is just as little to the point, in the matter at issue, for Mr. Lewes to inform the readers of NATURE that *intuition without thought is mere sensuous impression.*"

Is it to use "poisoned weapons" to interpret this as assuming that Intuition and Thought differ as potential and actual? I repeat that, since Mr. Sylvester disclaims the interpretation, my only course is to apologise for it; but, after his own misinterpretations of me, he will not, I hope, persist in attributing mine to a desire to take an unfair advantage. If I make no reply to the other points roused in the various letters it is in order not to prolong the discussion.

GEORGE HENRY LEWES

I DO not know whether Mr. Sylvester and Dr. Ingleby will be satisfied with Mr. Lewes' letter in yours of the 27th. I am not and I think, in defending his former mistake, Mr. Lewes has fallen into additional errors.

It is undoubtedly fair to translate an author into your own language before criticising him, provided you found no criticism on the language that you have put into his mouth. But this I think Mr. Lewes has done. He accuses Kant of inconsistency in speaking of pure *à priori* cognitions, when, on his own system, pure thought only supplies one element to these cognitions, the other being derived from sense or intuition. Now (not to insist here that Kant constantly uses the term cognition in a wider sense than that which Mr. Lewes insists on fastening upon him), this criticism is evidently invalidated by the simple remark that Kant admits pure intuitions, as well as pure concepts and explains the nature of mathematics, as a system of *à priori* cognitions, by the fact that its object-matter consists of nothing but pure intuitions.

Mr. Lewes now informs us that Kant's Intuition and Thought "differ as species and genus." According to Kant they differ in kind; and Liebnitz was as wrong in making sensibility a species of thought as Locke was in making Thought a species of sensibility. Space and Time, Mr. Lewes adds, are forms of "mental activity" and, therefore, are properly termed "forms of Thought," in the meaning of the latter term which is usually current in this country. If they were forms of mental activity they would be forms of Thought, according to Kant, likewise; for the criterion by which Kant distinguishes between Intuition and Thought (under which term he includes both the understanding proper and the reason proper) is that, in the former, the mind is passive (receptive) while, in the latter, it is spontaneously active; and it is precisely on this ground—the passive reception of them by the mind—that he refers Space and Time to Sensibility rather than Thought. This is repeatedly brought out in the Transcendental Deduction of the Categories. See in particular Sections 11 (Meiklejohn, p. 80) and 18 (Meiklejohn, p. 90).

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I think if Mr. Lewes will turn to the preface to the first edition of the "Critick," he will see that the transcendental logic only (and perhaps I might limit it to the transcendental dialectic) grapples *directly* with the problem indicated by the title of the book. The Æsthetic is a preliminary inquiry, which proves afterwards of great use; but is not to be considered as a Critick of Pure Reason in this particular department. His using the term "concept" of space, is certainly confusing; but its explanation, I think, is to be found in a passage in the "Transcendental Exposition" of this "concept" (Meiklejohn, p. 25), where he says, "It must be *originally* intuition, for from a *mere* conception no propositions can be deducted which go out beyond the conception and this happens in geometry." In the preceding page he similarly qualifies his statement that Space is an intuition. "No conception *as such*," he says, "can be so conceived as if it contained, within itself, an infinite multitude of representations." We may *now* have a concept as well as an intuition of Space and Time; but the intuition was the original form of the idea and it is to the intuition that we must always have recourse in mathematics when we wish to discover a new truth.

I think, if Mr. Lewes will again read over the Transcendental Æsthetic and the parts of the Transcendental Analytic which are closely related to it, he will see that Kant never designates the *original* representations of space and time "concepts," or refers their origin to "pure reason." W. H. STANLEY MONCK

Trinity College, Dublin, Jan. 29

[This correspondence must now cease.—ED.]

NOTES

THE Gold Medal of the Royal Astronomical Society will be presented to M. Delaunay, the president of the Paris Academy of Sciences, to-morrow. It is to be regretted that the stay of the distinguished French savant in England is but short.

WE referred last week to the "situation" at the Paris Observatory. The action of the French Government has been of the promptest and M. Le Verrier is no longer Director. This step indicates very clearly—too clearly we fear—the strength of the case put before the Minister of Public Instruction, in the memorial, of which a copy has been sent to us. This document, which is signed by all the *chefs de service*—Villarceau, Marié-Davy, Wolf, and Loewy—and the *astronomes adjoints* without exception, discusses all points connected with the administration of the Observatory, scientific and otherwise. It is to be sincerely hoped that M. Le Verrier may be able yet to do service to astronomy, in some other capacity, some position where his great talents alone will be called into play. His is a name that will never die, let us hope it is but momentarily eclipsed.

THE Trustees of the Johnson Memorial Prize for the encouragement of the study of astronomy and meteorology propose "the laws of wind" as the subject for the next essay:—1. With regard to storms; 2. With regard to average periodical phenomena at given places on the earth's surface. The prize is open to all members of the University of Oxford and consists of a gold medal of the value of ten guineas, together with so much of the dividends, for four years, on 338*l*. Reduced Annuities as shall remain after the cost of the medal and other expenses have been defrayed. Candidates are to send their essays to the registrar of the university under a sealed cover, marked "Johnson Memorial Prize Essay," on or before the 31st day of March, 1871, each candidate concealing his name, distinguishing his essay by a motto and sending at the same time his name, sealed up under another cover, with the same motto written upon it. No essay will be received after the 31st day of March, 1871.

A NEW office has been constituted under the Public Works Department and Mr. Douglas Galton, C.B., F.R.S., has been appointed to it with the title of Director of Works and Buildings. We may congratulate ourselves that our public building will be looked after by one so eminently qualified by his high scientific attainments and great experience in such matters.

AT the meeting of the French Academy on January 31, the two candidates recommended for the vacancy in the Bureau des Longitudes were M. de la Roche-Poncié and M. Gaussin. The former received 40 votes out of 43. At the same meeting the mineralogical section presented a list of candidates for the vacancy in the list of correspondents to replace Sir Roderick Murchison, who has recently been nominated a foreign associate. The candidates were, in the first rank, Prof. C. F. Naumann; in the second, in alphabetical order, MM. Abich, Gustav Bischoff, Ami Boué, Dana, von Dechen, Domeyko, James Hall, von Hauer, von Helmersen, C. T. Jackson, Kjerulf, von Kokscharow, W. E. Logan, W. H. Miller, Ferdinand Römer, Scacchi, A. Sismonda, and Studer.

THE *Goloss*, of St. Petersburg, says that a special commission will shortly be appointed by the Academy of Sciences there, for the purpose of observing the transit of Venus on the 26th of November, 1874 (old style). The members of the commission are to be Messrs. Struve, Savitch and Wild, of the Russian Academy; Messrs. Döllen and Wagner, superintendents of the Observatory at Pulkova; Vice-Admiral S. J. Seleny and Major-General Forsch. The *Goloss* adds that the reason the commission will be appointed so early, is that much time will be required for making the necessary preparations and that similar commissions have been already appointed in England, France and Germany.

PROF. W. H. FLOWER, who has recently been appointed Hunterian Professor of Comparative Anatomy and Physiology, will commence a course of eighteen lectures introductory to the study of the anatomy of the class Mammalia, on Monday, February 14, 1870, in the Theatre of the Royal College of Surgeons. The lectures are to be delivered on succeeding Mondays, Wednesdays and Fridays, at four o'clock and will treat of methods and aims in the study of morphology: classification of the mammalia; osseous system of the mammalia: Axial skeleton—vertebral column; modifications of the characters of the vertebræ in the cervical, thoracic, lumbar, sacral and caudal regions in different mammals; sternum, cranium, hyoid arch. Appendicular skeleton—essential structure and modifications of the bones composing the shoulder-girdle and anterior extremity; structure and modifications of the pelvic girdle and posterior extremity; comparison between the structure and the functions of the anterior and the posterior extremities. Tegumentary system and its appendages: the dermis; modifications of the integument mainly due to peculiar conditions of the dermis; ossifications in the integument; the epidermis and its modifications; callosities, scales, nails, claws, hoofs, horns, hairs, spines, antlers, glandular organs connected with the integument, or opening on the external surface of the body; scent glands; mammary glands. Dental system: structure and essential characters of teeth; classification and nomenclature of teeth; development and succession of teeth; modifications of the characters of the teeth in the different groups of the Mammalia; horny structures taking the place of teeth in certain mammals. Baleen, &c. These lectures are open to Fellows and Members of the College of Surgeons and of learned and scientific bodies in the United Kingdom.

THE death is announced of E. W. Brayley, many years connected with the London Institution, and a frequent lecturer on scientific subjects. Mr. Brayley was well known for his scientific attainments and has contributed to scientific literature, some valuable papers on geology, astronomy and other subjects.

THE second course of Cantor Lectures for the present Session will be given by Dr. Benjamin Paul, F.C.S. The course will consist of four lectures, "On the Phenomena of Combustion and the Chemical and Physical Principles involved in the Use of Fuel and in the Production of Artificial Light," to be delivered on Monday evenings, the 7th, 14th, 21st, and 28th of March, at 8 o'clock.

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